

# **RENESAS SEMICONDUCTOR RELIABILITY REPORT**

GROUP : RX62T  
DEVICE : R5F562TXXX  
APPLICATION : Consumer / Industry

Quality Assurance Div.  
Renesas Electronics Corporation

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**Table. Reliability test results (QFP)**

| Test Items                             | Reference              | Test Conditions                      | Results<br>Failure/Size | Comment                     |
|----------------------------------------|------------------------|--------------------------------------|-------------------------|-----------------------------|
| High Temperature Operating Life (HTOL) | JESD22-A108            | Ta=125 °C, Vccmax, 1000 hrs          | 0/22                    |                             |
| High Temperature Storage Life (HTSL)   | JESD22-A103            | Ta=150 °C, 1000 hrs                  | 0/22                    |                             |
| Temperature Humidity bias (THB) (*1)   | JESD22-A101            | Ta=85 °C, RH=85 %, Vccmax, 1000 hrs  | 0/22                    |                             |
| Temperature Cycling (TC) (*1)          | JESD22-A104            | Ta=-65 °C to 150 °C , 300 cycles     | 0/22                    |                             |
| Latch-Up (LU)                          | JESD78                 | Pulse Current Injection, I=+/-150 mA | 0/3                     |                             |
| Electrostatic discharge (ESD-HBM)      | JS-001                 | 1.5 kΩ, 100 pF, +/-2000 V, 1 time    | 0/3                     | Class: 2                    |
| Electrostatic discharge (ESD-CDM)      | JEITA ED-4701/302      | +/-1000V,1time                       | 0/3                     | Class:<br>Equivalent to C2b |
| Solderability (SD)                     | J-STD-002              | 245 °C, 5 s, Solder coverage ≥95 %   | 0/5                     |                             |
| Resistance to Soldering Heat (PC)      | JESD22-A113, J-STD-020 | MSL3(Moisture Sensitivity Level 3)   | 0/22                    |                             |

\*1) With preconditioning per JESD22-A113, MSL 3

•It is tested to confirm that all the samples are satisfied with an individual product specification.

Note :

Basically qualification tests were performed using a representative product with the same wafer process and the same package structure .

The failure rate of the device in an actual use condition can be estimated by the below procedure.

•Equation for the failure rate estimation ( $\lambda$ )

$$\lambda = \lambda_b \times \pi T \text{ (FIT)}$$

①Unique failure rate ( $\lambda_b$ )

$$\lambda_b = 0.03 \text{ FIT}$$

Unique failure rate at  $T_a=55^\circ\text{C}$  using 60 % confidence level.

②Temperature term ( $\pi T$ )

$$\pi T = \exp\{11600 \times E_a \times (1/(273+55) - 1/(273+T_a))\}$$

$E_a$  : Activation energy (eV)

$T_a$  : Ambient temperature ( $^\circ\text{C}$ )

$\pi T$  simplified chart as  $E_a=0.7 \text{ eV}$

| $T_a$<br>( $^\circ\text{C}$ ) | 40   | 50   | 55 | 60   | 65   | 70   | 75   | 80   | 85   | 90    | 100   | 110   |
|-------------------------------|------|------|----|------|------|------|------|------|------|-------|-------|-------|
| $\pi T$                       | 0.31 | 0.68 | 1  | 1.45 | 2.08 | 2.95 | 4.15 | 5.77 | 7.96 | 10.88 | 19.82 | 34.99 |

•MTTF ( Mean Time To Failure )

$$MTTF = 1/\lambda$$

## Reference about Renesas package code

| Package type                    |     | Package code *1 |
|---------------------------------|-----|-----------------|
| Lead type plastic package       | QFP | PxQP            |
| Non-lead type plastic package   | QFN | PxQN            |
| Grid array type plastic package | BGA | PxBG            |
|                                 | LGA | PxLG            |

\*1. First four digit

Table. Product list

| No | Group | Product part number | Package code | No  | Group | Product part number | Package code |
|----|-------|---------------------|--------------|-----|-------|---------------------|--------------|
| 1  | RX62T | R5F562T6ADFF        | PLQP0080J*   | 51  | RX62T | R5F562T7BDFK        | PLQP0064G*   |
| 2  | RX62T | R5F562T6AGFF        | PLQP0080J*   | 52  | RX62T | R5F562T7BGFK        | PLQP0064G*   |
| 3  | RX62T | R5F562T6BDFF        | PLQP0080J*   | 53  | RX62T | R5F562T7DDFK        | PLQP0064G*   |
| 4  | RX62T | R5F562T6BGFF        | PLQP0080J*   | 54  | RX62T | R5F562T7EDFK        | PLQP0064G*   |
| 5  | RX62T | R5F562T6DDFF        | PLQP0080J*   | 55  | RX62T | R5F562TAADFK        | PLQP0064G*   |
| 6  | RX62T | R5F562T6EDFF        | PLQP0080J*   | 56  | RX62T | R5F562TAAGFK        | PLQP0064G*   |
| 7  | RX62T | R5F562T6GDFF        | PLQP0080J*   | 57  | RX62T | R5F562TABDFK        | PLQP0064G*   |
| 8  | RX62T | R5F562T6GGFF        | PLQP0080J*   | 58  | RX62T | R5F562TABGFK        | PLQP0064G*   |
| 9  | RX62T | R5F562T6HDFF        | PLQP0080J*   | 59  | RX62T | R5F562TADDFK        | PLQP0064G*   |
| 10 | RX62T | R5F562T6HGFF        | PLQP0080J*   | 60  | RX62T | R5F562TAEDFK        | PLQP0064G*   |
| 11 | RX62T | R5F562T7ADFF        | PLQP0080J*   | 61  | RX62T | R5F562T6ADFM        | PLQP0064K*   |
| 12 | RX62T | R5F562T7AGFF        | PLQP0080J*   | 62  | RX62T | R5F562T6AGFM        | PLQP0064K*   |
| 13 | RX62T | R5F562T7BDFF        | PLQP0080J*   | 63  | RX62T | R5F562T6BDFM        | PLQP0064K*   |
| 14 | RX62T | R5F562T7BGFF        | PLQP0080J*   | 64  | RX62T | R5F562T6BGFM        | PLQP0064K*   |
| 15 | RX62T | R5F562T7DDFF        | PLQP0080J*   | 65  | RX62T | R5F562T6DDFM        | PLQP0064K*   |
| 16 | RX62T | R5F562T7EDFF        | PLQP0080J*   | 66  | RX62T | R5F562T6EDFM        | PLQP0064K*   |
| 17 | RX62T | R5F562T7GDFF        | PLQP0080J*   | 67  | RX62T | R5F562T7ADFM        | PLQP0064K*   |
| 18 | RX62T | R5F562T7GGFF        | PLQP0080J*   | 68  | RX62T | R5F562T7AGFM        | PLQP0064K*   |
| 19 | RX62T | R5F562T7HDFF        | PLQP0080J*   | 69  | RX62T | R5F562T7BDFM        | PLQP0064K*   |
| 20 | RX62T | R5F562T7HGFF        | PLQP0080J*   | 70  | RX62T | R5F562T7BGFM        | PLQP0064K*   |
| 21 | RX62T | R5F562TAADFF        | PLQP0080J*   | 71  | RX62T | R5F562T7DDFM        | PLQP0064K*   |
| 22 | RX62T | R5F562TAAGFF        | PLQP0080J*   | 72  | RX62T | R5F562T7EDFM        | PLQP0064K*   |
| 23 | RX62T | R5F562TABDFF        | PLQP0080J*   | 73  | RX62T | R5F562TAADFM        | PLQP0064K*   |
| 24 | RX62T | R5F562TABGFF        | PLQP0080J*   | 74  | RX62T | R5F562TAAGFM        | PLQP0064K*   |
| 25 | RX62T | R5F562TADDF         | PLQP0080J*   | 75  | RX62T | R5F562TABDFM        | PLQP0064K*   |
| 26 | RX62T | R5F562TAEDFF        | PLQP0080J*   | 76  | RX62T | R5F562TABGFM        | PLQP0064K*   |
| 27 | RX62T | R5F562TAGDFF        | PLQP0080J*   | 77  | RX62T | R5F562TADDFM        | PLQP0064K*   |
| 28 | RX62T | R5F562TAGGFF        | PLQP0080J*   | 78  | RX62T | R5F562TAEDFM        | PLQP0064K*   |
| 29 | RX62T | R5F562TAHDFF        | PLQP0080J*   | 79  | RX62T | R5F562T7ADFP        | PLQP0100K*   |
| 30 | RX62T | R5F562TAHGFF        | PLQP0080J*   | 80  | RX62T | R5F562T7AGFP        | PLQP0100K*   |
| 31 | RX62T | R5F562T7ADFH        | PLQP0112J*   | 81  | RX62T | R5F562T7BDFP        | PLQP0100K*   |
| 32 | RX62T | R5F562T7AGFH        | PLQP0112J*   | 82  | RX62T | R5F562T7BGFP        | PLQP0100K*   |
| 33 | RX62T | R5F562T7BDFH        | PLQP0112J*   | 83  | RX62T | R5F562T7DDFP        | PLQP0100K*   |
| 34 | RX62T | R5F562T7BGFH        | PLQP0112J*   | 84  | RX62T | R5F562T7EDFP        | PLQP0100K*   |
| 35 | RX62T | R5F562T7DDFH        | PLQP0112J*   | 85  | RX62T | R5F562TAADFP        | PLQP0100K*   |
| 36 | RX62T | R5F562T7EDFH        | PLQP0112J*   | 86  | RX62T | R5F562TAAGFP        | PLQP0100K*   |
| 37 | RX62T | R5F562TAADFH        | PLQP0112J*   | 87  | RX62T | R5F562TABDFP        | PLQP0100K*   |
| 38 | RX62T | R5F562TAAGFH        | PLQP0112J*   | 88  | RX62T | R5F562TABGFP        | PLQP0100K*   |
| 39 | RX62T | R5F562TABDFH        | PLQP0112J*   | 89  | RX62T | R5F562TADDFP        | PLQP0100K*   |
| 40 | RX62T | R5F562TABGFH        | PLQP0112J*   | 90  | RX62T | R5F562TAEDFP        | PLQP0100K*   |
| 41 | RX62T | R5F562TADDFH        | PLQP0112J*   | 91  |       |                     |              |
| 42 | RX62T | R5F562TAEDFH        | PLQP0112J*   | 92  |       |                     |              |
| 43 | RX62T | R5F562T6ADFK        | PLQP0064G*   | 93  |       |                     |              |
| 44 | RX62T | R5F562T6AGFK        | PLQP0064G*   | 94  |       |                     |              |
| 45 | RX62T | R5F562T6BDFK        | PLQP0064G*   | 95  |       |                     |              |
| 46 | RX62T | R5F562T6BGFK        | PLQP0064G*   | 96  |       |                     |              |
| 47 | RX62T | R5F562T6DDFK        | PLQP0064G*   | 97  |       |                     |              |
| 48 | RX62T | R5F562T6EDFK        | PLQP0064G*   | 98  |       |                     |              |
| 49 | RX62T | R5F562T7ADFK        | PLQP0064G*   | 99  |       |                     |              |
| 50 | RX62T | R5F562T7AGFK        | PLQP0064G*   | 100 |       |                     |              |